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United States Department of Commerce
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This paper attempts to answer the question, "Why are small scale pool fires anchored?" by providing and interpreting a new set of experimental data. For momentum-controlled, high Reynolds (Re) number turbulent-jet diffusion flames, the formation of a premixing zone is suggested as the primary reason for the flame anchoring. For buoyancy-controlled pool fires, however, the existence of the premixing zone at the flame base is not clear because both Re and Fr (Froude number) are low. To improve our understanding of the flame anchoring mechanism and structure of buoyancy-controlled liquid pool fires, we employed small scale pool fires whose diameters range between 1.5-20 cm. Our measurements include flow visualization by a particle-track laser-sheet technique (PTLS) combined with a high speed video camera and temperature profiles by a fine thermocouple.

KEY WORDS (MAXIMUM OF 9; 28 CHARACTERS AND SPACES EACH; SEPARATE WITH SEMICOLONS; ALPHABETIC ORDER; CAPITALIZE ONLY PROPER NAMES)

air entrainment; diffusion flames; flame spread; flow visualization; pool fires; small scale fire tests; temperature profiles

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